AIRSEEDING DRY BEANS

A. Vandenberg and A. Kapiniak
(Saskatchewan Irrigation Development Centre)

INTRODUCTION

Dry bean seed is fragile compared to seed of other pulse crops, and needs to be handled gently in all operations. The recommended gravity flow seeding equipment (hoe drill or double-disk press drill) has been replaced by airseeders on many farms in Saskatchewan.

In 1989 research was initiated at the Saskatchewan Irrigation Development Centre to determine if airseeders could successfully establish a dry bean crop. Results showed that it was possible if the bean seed moisture content was at least 16% and the airseeder did not have two distributing manifolds. In 1990 the research experiment was repeated. Also, a commercial field scale demonstration was organized to compare airseeding to hoe drilling pinto bean. Details of the research and demonstrations are discussed below.

MATERIALS AND METHODS

Research

Airseeder selection was based on the number of distributing manifolds. Table 1 lists the airseeders used and the number of distributors in each system.

Table 1 also shows the seed weight and moisture content of each cultivar used in the experiment. The low moisture treatment is the ambient percentage. Two pound packages of bean seed were hydrated to 16-18% moisture content, by adding water to the package. Low and high moisture content bean seed of each cultivar were passed through each airseeder. There were six replications. The seeds were collected by mesh bags place over the soil opener. All samples were visually inspected to determine the percentage of seeds damaged by the airseeder. Subsamples were seeded at SIDC using a gravity flow cone seeder. Plots were arranged in a randomized complete block design. Post emergent stand counts were determined by counting the number of seedlings per 4′ x 12′ plot. A small plot Wintersteiger combine was used to harvest the plots. Yields were determined from the weight of cleaned samples.

Demonstration

In 1990, a field scale demonstration was organized at three sites with three co-operating farmers. Each field was divided into six strips. Pinto bean seed with an ambient moisture content (approximately 10%) was seeded with a hoe drill into three strips. Hydrated pinto bean seed (16-18% moisture content) was airseeded into the remaining three strips.

Plant stands were determined by counting the number of plants along a one meter length in two rows (equal to one square meter), at ten random locations within each strip.

Harvesting at each site was done by the co-operator. All combines were equipped with a flex header and air-reel. Grain samples were obtained by harvesting 500 feet of crop down the centre of each treatment strip. Yields were determined using a weigh wagon.

Table 1

Airseeders, Seed Type, and Moisture Content Treatments for Research of Airseeding Dry Bean.

	Treatments	
Factor	1989	1990
Airseeder	Wil-Rich 4500 (no distributor) John Deere 777 (1 distributor) Morris (1 distributor) Bourgault 2155 (2 distributors) Control	Wil-Rich 4500 (no distributor) John Deere 777 (1 distributor-no pads) John Deere 777 (1 distributor-padded) Bourgault 2155 (2 distributors) Control
Seed type	Beryl 280 mg/seed Topaz 240 mg/seed Topaz 350 mg/seed	Beryl 320 mg/seed Topaz 250 mg/seed
Moisture content	Low ~11.5% High 16-18%	Low ~10.0% High 16-18%

RESULTS AND DISCUSSION

Results from 1989 and 1990 have been combined. Visual seed damage, plant population density, and yield results are shown in Figures 1-3. The Morris and John Deere (padded) treatments are not included in Figures 1-3 because there is data from only one year for each treatment. Results from these two treatments closely parallel those of the John Deere (no pads) treatment. Figure 4 compares percent damaged seed between cultivars.

Results from the demonstration are shown in Table 2. The low plant stand in strips seeded with an airseeder on field 3 was due to seeding rate (calibration difficulties), not damaged seed. There was no significant difference in stand or yield between seeder types.

Fig. 1

Effect of airseeder and seed moisture on seed damage for Topaz dry bean

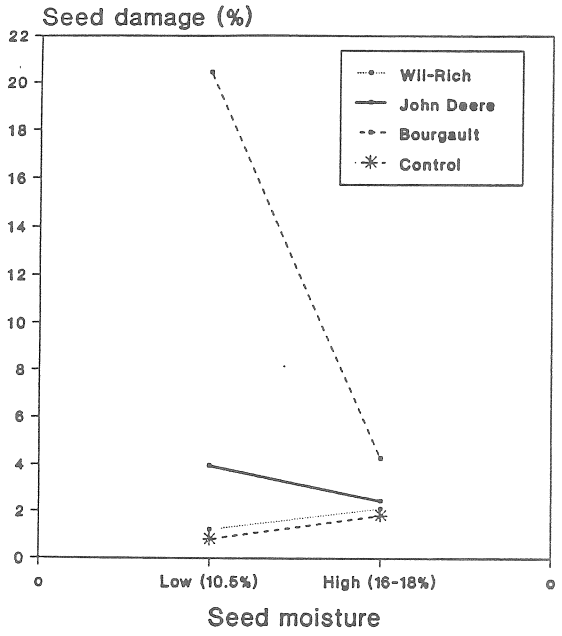
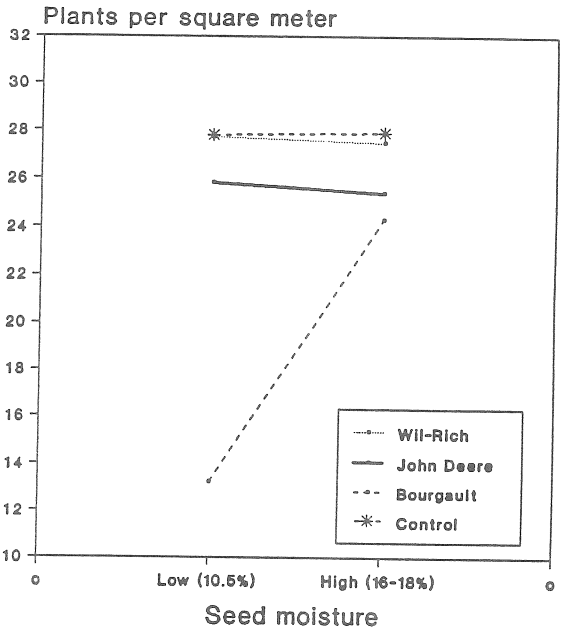


Fig. 2

Effect of airseeder and seed moisture on plant stand* of dry bean



*Stand refers to healthy seedlings

Fig. 3

Effect of airseeder and seed moisture on yield of dry bean

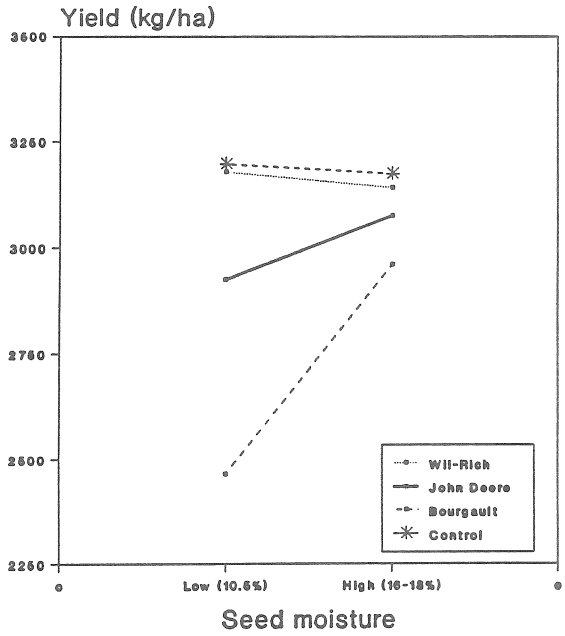
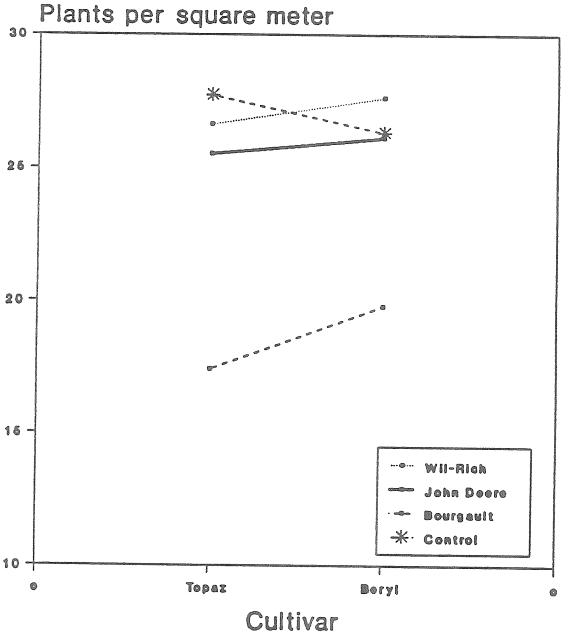


Fig. 4

Effect of airseeder and cultivar on plant stand* of dry bean



*Stand refers to healthy seedlings

Table 2

SEEDING DEMONSTRATION 1990
Total yield and stand

Field #	Yield (lb/acre)		Stand (plants/m2)	
	Hoe	Air	Hoe	Air
1	1494	1396	25	25
2	1198	1331	21	27
3	1244	958	28	14

CONCLUSION

Damage to dry bean seed results in reduced plant stand and yield. Therefore, reducing seed damage from an airseeder with impact distributing manifolds is essential to successful establishment of a dry bean crop. Increasing the moisture content of bean seed to 16-18% reduced seed damage by airseeders. Significant reductions in yield and plant stand occurred when airseeders with two distributing manifolds were used. Cultivar and variety also affect the success of airseeding dry bean. Results from the experiment indicated that Beryl great northern bean does not damage as easily as Topaz pinto bean. Results from these research and demonstration projects clearly show that a productive dry bean crop can be established with airseeders when the moisture content of the bean seed is at least 16 percent.

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Co-operators:

Airseeders:
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* Dale Eliason (Bourgault) --- Outlook
* Morris Industries Ltd. (Morris) --- Yorkton
* Northend Service Ltd. (Wil-Rich) --- Ituna
* Remeshylo Farm Equipment Ltd. (Wil-Rich) --- North Battleford

Demonstrations:
* Wayne Jones --- Birsay
* Bob Tullis --- Lucky Lake
* Brent Whenham --- Dunblane